



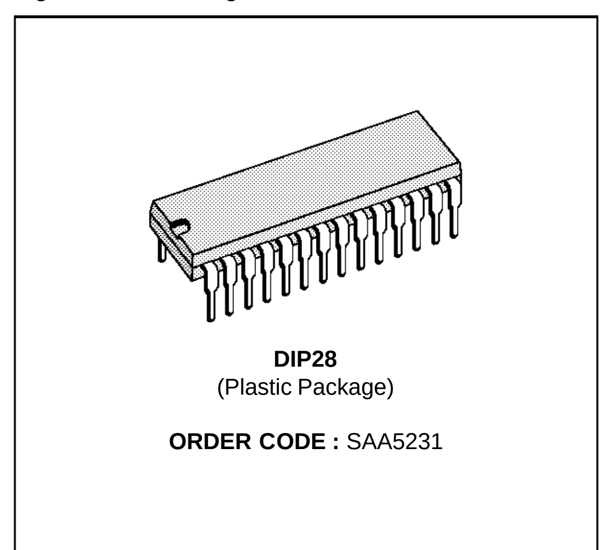


# DATA SLICER FOR TELETEXT PROCESSOR

- SEPARATION OF TELETEXT DATA FROM THE COMPOSITE VIDEO SIGNAL
- SEPARATION OF HORIZONTAL AND VERTICAL SYNCHRONIZATION SIGNALS FROM THE COMPOSITE VIDEO SIGNAL
- EXTERNAL OSCILLATOR GENERATING 6MHz SIGNAL SYNCHRONIZED TO A MULTIPLE OF THE LINE FREQUENCY BY PLL
- A 6.9375MHz CLOCK GENERATED FROM AN EXTERNAL QUARTZ CRYSTAL
- ”AFTER-HOURS” SYNCHRONIZATION OPTION
- PROGRAMMABLE LEVELS FOR THE INPUT COMPOSITE VIDEO SIGNAL (1V OR 2.5V)
- PROCESSING OF EXTERNAL TELETEXT DATA
- OUTPUT OF POSITIVE OR NEGATIVE SYNCHRONIZING SIGNALS
- 28 PIN DIP PACKAGE
- HDS2P2 TECHNOLOGY

## DESCRIPTION

The SAA5231 is a monolithic integrated circuit in 28 Pin DIP package designed to separate Teletext signals from TV signal.



**DIP28**
(Plastic Package)

**ORDER CODE :** SAA5231

## PIN CONNECTIONS

| Function | Pin | Pin | Function |
|---|---|---|---|
| Sync. Output | 1 | 28 | $\overline{TCS}$ / $\overline{SCS}$ |
| Video Input Level Select | 2 | 27 | Composite Video Input |
| HF Filter | 3 | 26 | Black Level |
| Store HF | 4 | 25 | VCS |
| Store Amplitude | 5 | 24 | Pulse Timing Capacitor |
| Store Zero Level | 6 | 23 | Pulse Timing Resistor |
| External Data Input | 7 | 22 | Sandcastle Input Pulse ($\overline{PL}$ / $\overline{CBB}$) |
| Data Timing | 8 | 21 | Filter 1 |
| Store Phase | 9 | 20 | Oscillator Input |
| $\overline{VCR}$ | 10 | 19 | Filter 2 |
| Xtal | 11 | 18 | Oscillator Output |
| Clock Filter | 12 | 17 | 6 MHz Output (F6) |
| Ground | 13 | 16 | Supply Vcc |
| Clock Output (TTC) | 14 | 15 | Data Output (TTD) |

5231-01.EPS

## PIN DESCRIPTION

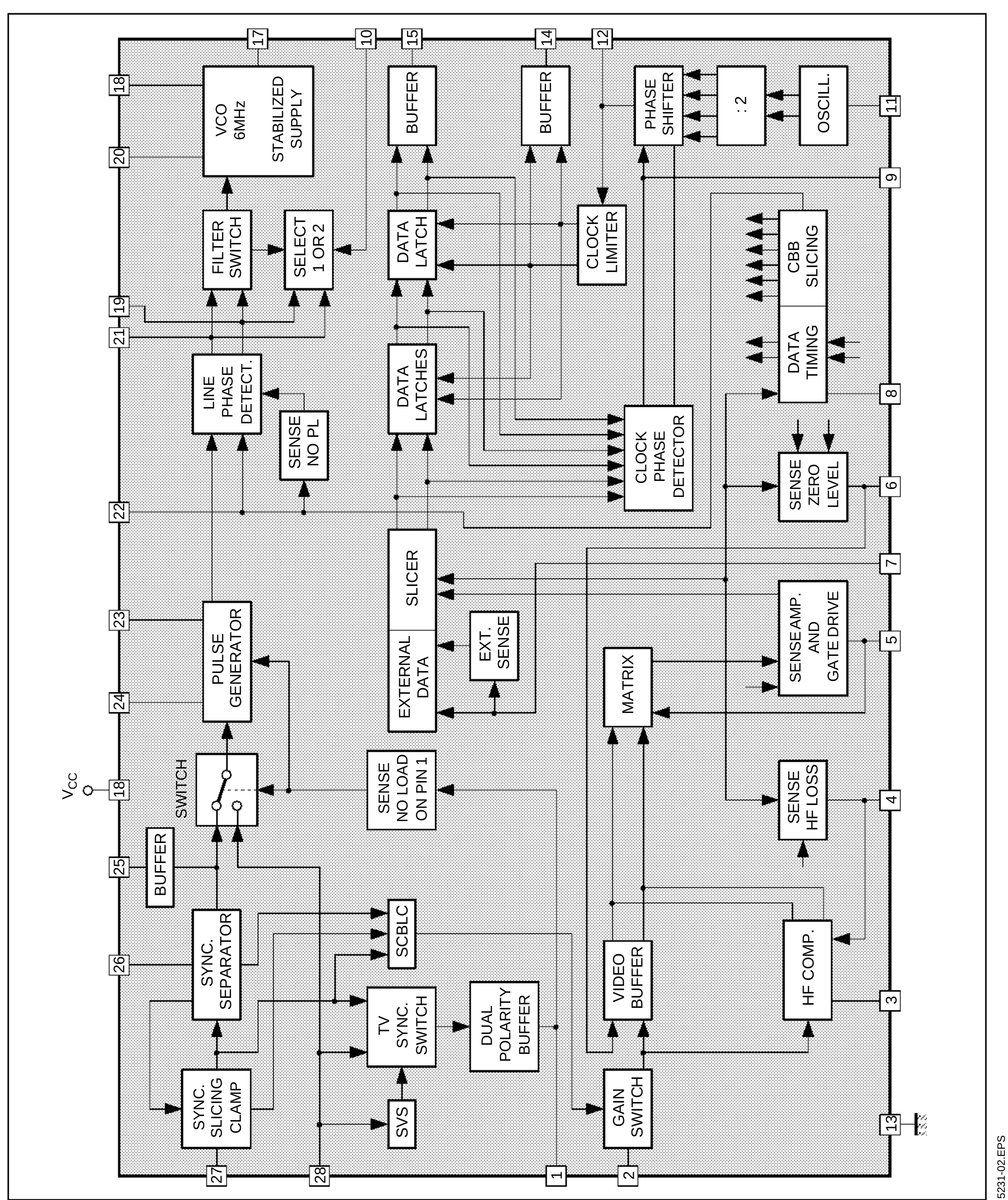
| Pin | Function | Description |
|---|---|---|
| 1 | Display Synchronization Outputs | Synchronization signal output available as positive or negative |
| 2 | Input video signal level | Input level selected as 1V (Pin 2 low) or 2.5V (Pin 2 not connected) |
| 3 | H.F. filter | Video signal filtering using an external capacitor of 15pF |
| 4-5-6 | ”Store HF”<br>”Store amplitude”<br>”Store zero level” | Three external capacitors used to store :<br>1/ HF amplitude<br>2/ Amplitude of adaptative data slicer<br>3/ Zero level |
| 7 | External data input | ”Teletext data slice” input from external circuit |
| 8 | Data timing | Connection of an external 270pF capacitor for the timing of the adaptative data slicer |
| 9 | Store phase | Storage on an external capacitor of the output signal ”Clock phase detector” |
| 10 | ”Video Tape Recorder” mode ($\overline{VCR}$) | Control signal for the PLL in the low-time constant mode |
| 11 | Crystal | External connection for a 13.875MHz crystal. This frequency, divided by 2, yields the 6.9375MHz cloc |
| 12 | Clock filter | Filter for 6.9375MHz clock |
| 13 | Ground | |
| 14 | Teletext clock output | Clock output for the SDA5243 |
| 15 | Teletext data output | Output of Teletext data for the SDA5243 |
| 16 | Supply $V_{CC}$ | |
| 17 | 6MHz clock output | 6MHz clock output for the SDA5243 |
| 18/20 | Oscillator output/input | An external resonant circuit between Pins 18 and 20 is connected to the 6MHz internal $V_{CO}$ |
| 19 | Filter 2 | Low time constant filter for phase detection of the horizontal signal |
| 21 | Filter 1 | High time constant filter for phase detection of the horizontal signal |
| 22 | ”Sandcastle” input pulse | Input of the sandcastle signal produced by the SDA5243 from the PL and CBB signals |
| 23 | Pulse timing resistor | External resistor of 68 kohms used to define the current for the pulse generator |
| 24 | Pulse timing capacitor | External capacitor of 270pF to define the timing of the pulse generator |
| 25 | Composite video synchronizing output (VCS) | Synchronizing output for the SDA5243 |
| 26 | Black level | Storage of the black level for the adaptive sync. Separator on an external 68nF capacitor |
| 27 | Composite video input | Composite video signal input for the adaptive sync. Separator via an external capacitor of 2.2µF |
| 28 | Teletext composite sync. input ($\overline{TCS}$) or Scan composite sync. input (SCS) | $\overline{TCS}$ input from the SDA5243 or $\overline{SCS}$ input from an alternative synchronizing circuit. |

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## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{16}$ | Supply Voltage | 13.2 | V |
| $-I_{25}$ | Output Current VCS | 5 | mA |
| $-I_{15}$ | Output Current TTD | 10 | mA |
| $-I_{14}$ | Output Current TTC | 10 | mA |
| $-I_{17}$ | Output Current F6 | 10 | mA |
| $I_1$ | Output Current Sync. | 5 | mA |
| $T_{stg}$ | Storage Temperature | -40, +150 | $^oC$ |
| $T_j$ | Junction | 0, +150 | $^oC$ |
| $T_{amb}$ | Ambient Temperature | 0, +70 | $^oC$ |

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## THERMAL DATA

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{th\ (j\text{-}a)}$ | Thermal Resistance Junction-Ambient | Max. | 70 | $^oC/W$ |

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## ELECTRICAL CHARACTERISTICS ($V_S$ = 12 V , $T_A$ = 25$^oC$ , unless otherwise specified)

| Symbol | Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| POWER SUPPLY (Pin 16) | | | | | |
| $V_S$ | Supply Voltage | 10.8 | 12 | 13.2 | V |
| $I_S$ | Supply Current | | 70 | | mA |
| CVBS INPUT (Pin 27) | | | | | |
| $V_{27}$ | Input Signal Level<br>Pin 2 to ground<br>Pin 2 open | <br>0.7<br>1.75 | <br>1<br>2.5 | <br>1.4<br>3.5 | <br>v<br>v |
| $V_{27(p\text{-}p)}$ | Synchronism Signal Amplitude | 0.1 | - | 1 | V |
| $V_{27(txt)}$ | Teletext Data Level<br>Pin 2 to ground<br>Pin 2 open | <br>0.3<br>0.75 | <br>0.46<br>1.15 | <br>0.7<br>1.75 | <br>v<br>v |
| $R_{G27}$ | Generator Resistance | | | 250 | Ω |
| VIDEO INPUT LEVEL SELECT (Pin 2) | | | | | |
| $V_{2L}$ | Low Voltage ($V_{27}$ = 1V) | 0 | | 0.8 | V |
| $V_{2H}$ | High Voltage ($V_{27}$ = 2.5V) | 2 | | 5.5 | V |
| $-I_{2L}$ | Low Current | 0 | | 150 | µA |
| $I_{2H}$ | High Current | 0 | | 1.3 | mA |
| TELETEXT DATA (Pin 5) | | | | | |
| $V_{15(p\text{-}p)}$ | Signal TTD Output | 2.5 | 3.5 | 4.5 | V |
| $t_r$ , $t_f$ | Transition Times | 20 | 30 | 45 | ns |
| $C_{15}$ | Load Capacitance | | | 40 | pF |
| $V_{15DC}$ | DC Voltage at Output | | 4 | | V |
| DATA CLOCK (Pin 14) | | | | | |
| $V_{14(p\text{-}p)}$ | Signal TTC | 2.5 | 3.5 | 4.5 | V |
| $t_r$ , $t_f$ | Transition Times | 20 | 30 | 45 | ns |
| $C_{14}$ | Load Capacitance | | | 40 | pF |
| $t_D$ | Time Deviation with Respect to TTD | -20 | 0 | 20 | ns |
| $V_{14DC}$ | DC Voltage at Output | | 4 | | V |
| SYNC. PULSE SEPARATION VCS (to SDA5243) (Pin 25) | | | | | |
| $V_{25L}$ | Low Output Voltage | 0 | | 0.4 | V |
| $V_{25H}$ | High Output Voltage | 2.1 | | 5.5 | V |

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**ELECTRICAL CHARACTERISTICS** ($V_S$ = 12 V , $T_A$ = 25$^o$C ,unless otherwise specified) (continued)

| Symbol | Parameter | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| SYNC. PULSE SEPARATION VCS (to SDA5243) (Pin 25) | | | | | |
| $I_{25L}$ | Low Output Current | | | 0.5 | mA |
| $-I_{25H}$ | HighOutput Current | | | 1.5 | mA |
| $t_D$ | Delay with respect to CVBS sync. | | 0.5 | | µs |
| SYNC. OUTPUT DRIVER (to TV set) (Pin 1) | | | | | |
| $V_{1(p-p)}$ | Output Voltage<br>$\overline{TCS}$ Operation<br>CVBS Operation | | <br>0.45<br> | <br><br>1 | <br>V<br>V |
| $V_{1DC}$ | DC voltage with load resistor to ground (positive synchronous signal) | | 1.4 | | V |
| $-I_1$ | Output Current | | | 3 | mA |
| $V_{1DC}$ | DC voltage with load resistor to $V_S$ (negative synchrononous signal) | | 10.1 | | V |
| $I_1$ | Output Current | | | 3 | mA |
| 6MHz CLOCK F6 (Pin 7) | | | | | |
| $V_{17(p-p)}$ | F6 Output Signal (negligible harmonic content) | 1 | 2 | 3 | V |
| $t_r$ , $t_f$ | Transition Times | 20 | | 40 | ns |
| $C_{17}$ | Load Capacitance | | | 40 | pF |
| $V_{17DC}$ | DC Voltage | 4 | | 8.5 | V |
| SYNCHRONIZATION SELECTION (Pin 28) | | | | | |
| $-I_{28}$ | Input Current $\overline{TCS}$ Operation ($V_{28}$ = 0 to 7 V) | 40 | 70 | 100 | µA |
| $I_{28}$ | Input Current CVBS Operation ($V_{28}$ = 10 to $V_S$) | -5 | 0 | 5 | µA |
| $V_{28L}$ | Low Input voltage ($\overline{TCS}$ operation) (load resistor at Pin 1) | 0 | | 0.8 | V |
| $V_{28H}$ | High Input voltage ($\overline{TCS}$ operation) (load resistor at Pin 1) | 2 | | 6.1 | V |
| $V_{28L}$ | Low Input Voltage ($\overline{SCS}$ operation) (Pin 1 open) | 0 | | 1.5 | V |
| $V_{28H}$ | High Input Voltage ($\overline{SCS}$ operation) (Pin 1 open) | 3.5 | | 6.1 | V |
| $t_p$ | Line Synchronous Pulse Width<br>$\overline{TCS}$ Operation<br>SCS Operation | | <br>2<br>3 | | <br>µs<br>µs |
| VCR OPERATION (Pin 10) | | | | | |
| $V_{10L}$ | Low Input Voltage VCR Operation | 0 | | 0.8 | V |
| $V_{10H}$ | High Input Voltage Standard Operation | 2 | | $V_S$ | V |
| $I_{10}$ | Input Current | -10 | 0 | 10 | A |
| SANDCASTLE PULSE INPUT (Pin 22) | | | | | |
| $V_{22L}$ | Phase Locked Mode Input Low Voltage PL | 0 | | 3 | V |
| $V_{22H}$ | Phase Locked Mode Input High Voltage PL | 3.9 | | 5.5 | V |
| $t_{pl}$ | PL - low time for free-wheeling oscillator | 100 | | | ms |
| $V_{22L}$ | Reset Pulse for Data Separation Input Low Voltage CBB | 0 | | 0.5 | V |
| $V_{22H}$ | Reset Pulse for Data Separation Input High Voltage CBB | 1 | | 5.5 | V |
| $I_{22}$ | Input Current | -10 | | 10 | µA |
| EXTERNAL DATA INPUT (CURRENT SOURCE DRIVING) (Pin 7) | | | | | |
| | Internal Data Processing Input | | | | |
| $I_7$ | Current | -10 | 0 | 100 | µA |
| $V_7$ | Voltage ($I_7$ = -10 to 100µA) | | 10 | | V |
| | External Data Processing Input | | | | |
| $I_{7L}$ | Current for low Level | -175 | -40 | -25 | µA |
| $I_{7H}$ | Current for High Level | -1000 | -500 | -325 | µA |
| $V_7$ | Voltage ($I_7$ = -1000 to -25µA) | 7 | 8 | | V |

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## APPLICATION DIAGRAMS

**Figure 1a :** Application Diagram with LC Circuit in 6MHz PLL

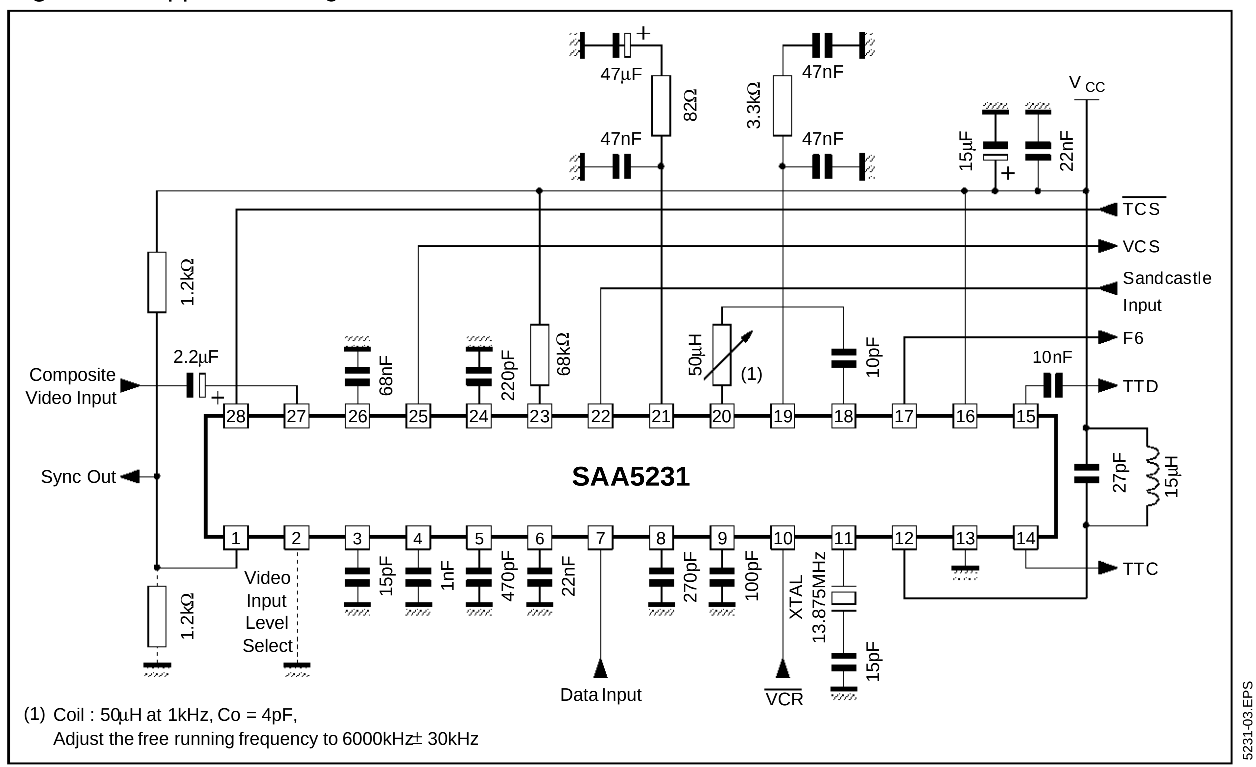
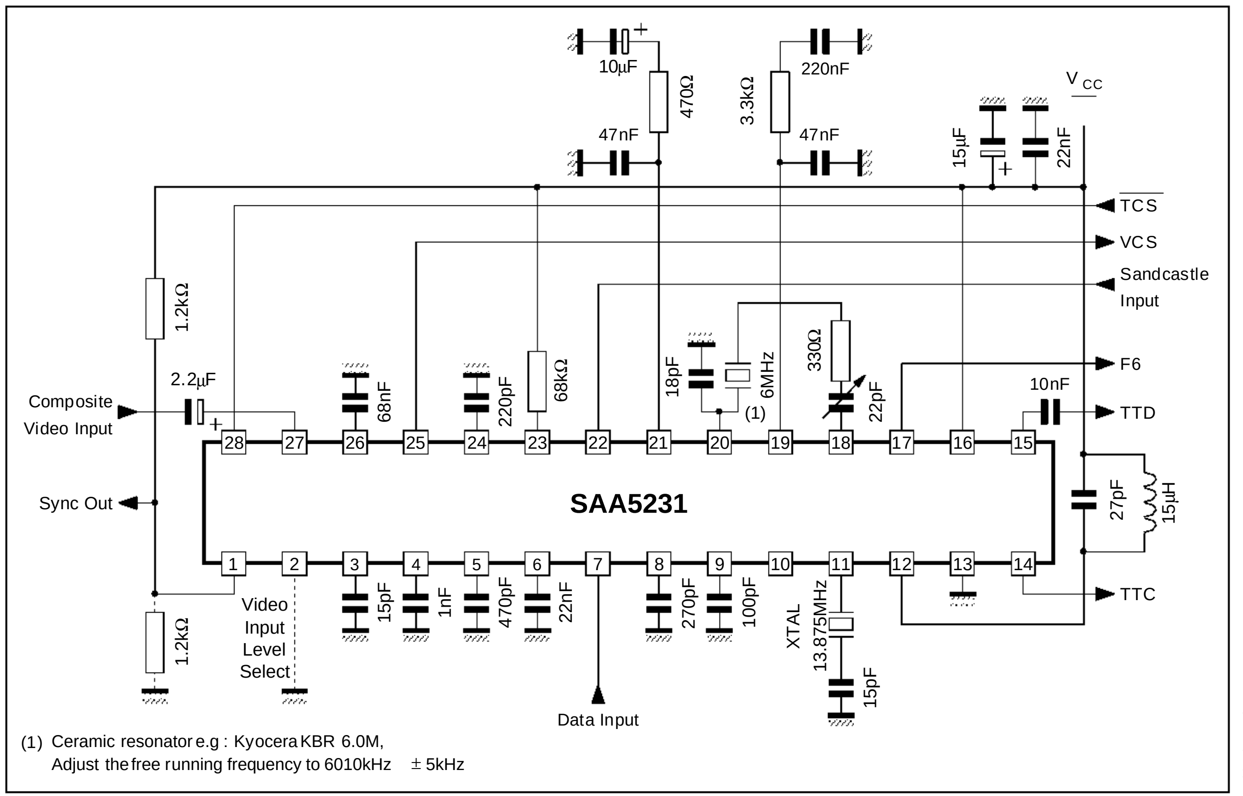
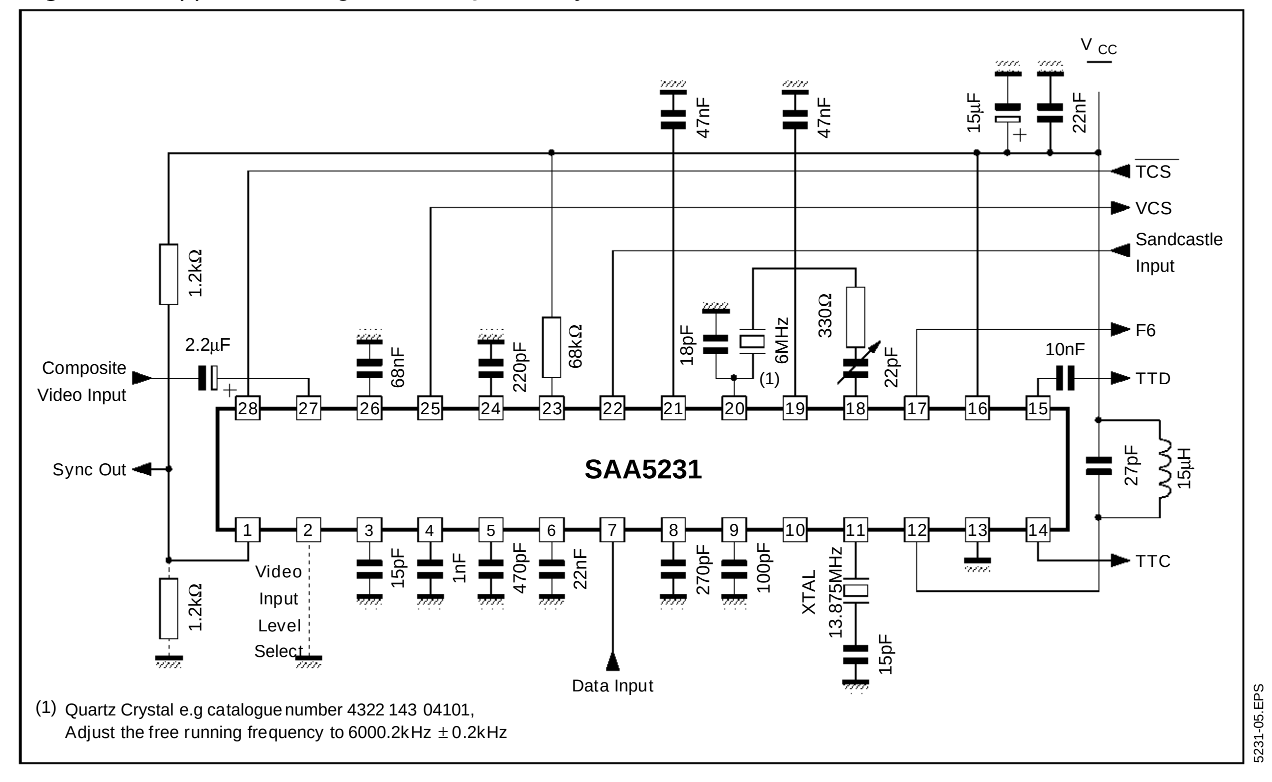



**Figure 1b :** Application Diagram with Ceramic Resonator in 6MHz PLL



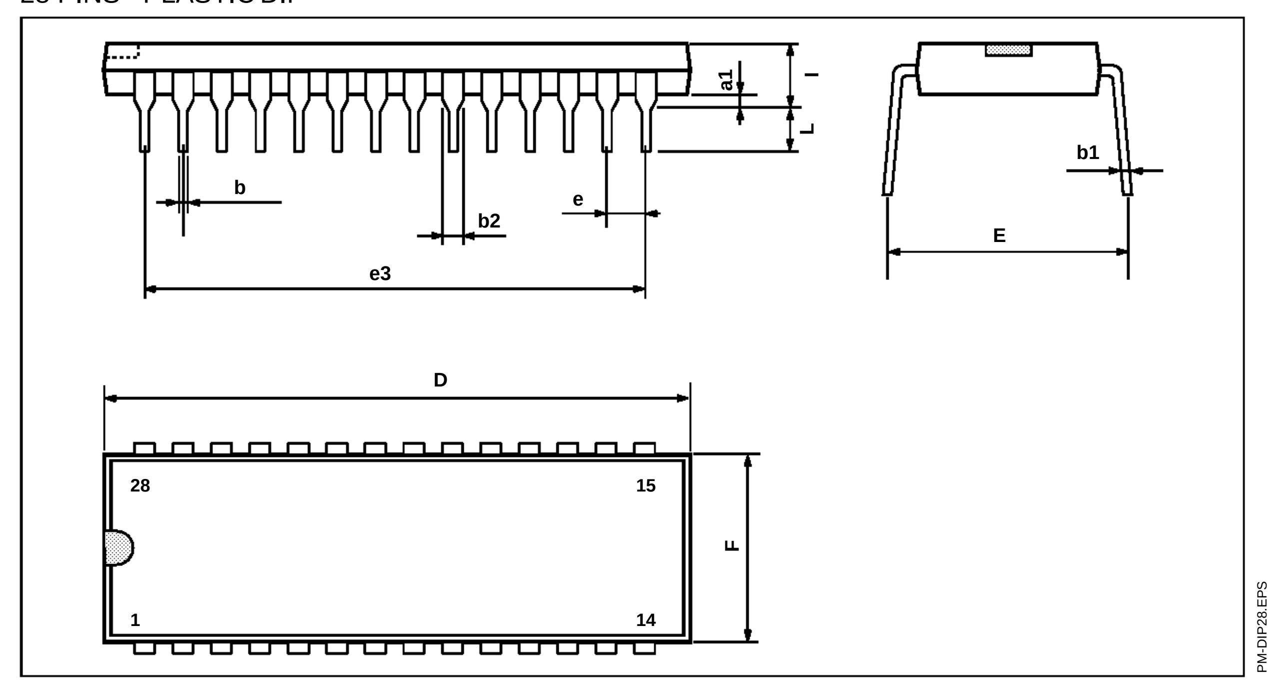
## APPLICATION DIAGRAMS (continued)

**Figure 1c :** Application Diagram with Quartz Crystal in 6MHz PLL



## PACKAGE MECHANICAL DATA

28 PINS - PLASTIC DIP




PM-DIP28.EPS

| Dimensions | Millimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| a1 | | 0.63 | | | 0.025 | |
| b | | 0.45 | | | 0.018 | |
| b1 | 0.23 | | 0.31 | 0.009 | | 0.012 |
| b2 | | 1.27 | | | 0.050 | |
| D | | | 37.4 | | | 1.470 |
| E | 15.2 | | 16.68 | 0.598 | | 0.657 |
| e | | 2.54 | | | 0.100 | |
| e3 | | 33.02 | | | 1.300 | |
| F | | | 14.1 | | | 0.555 |
| i | | 4.445 | | | 0.175 | |
| L | | 3.3 | | | 0.130 | |

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